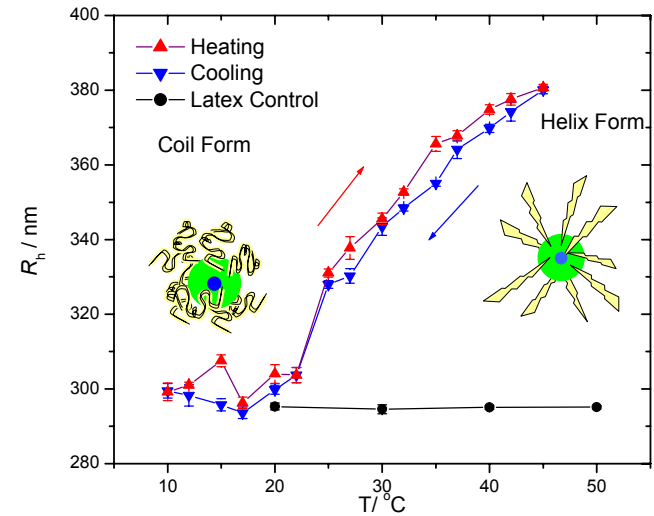


Complex Fluids with Extended, Rigid Components

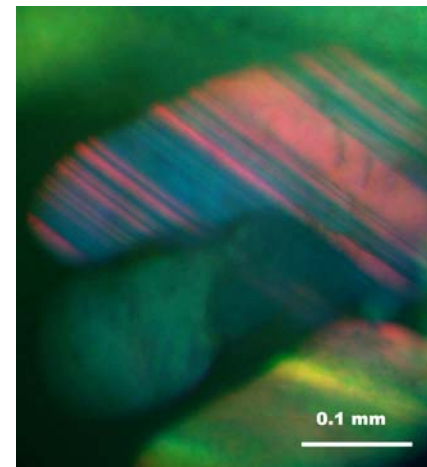
Paul S. Russo, Louisiana State University, DMR-0075810

Colloidal particles often supply the functional, easy-to-manipulate realization of nanometer-scale systems, including polymers for drug delivery, environmental cleanup and optical applications. Polypeptide-coated silica is promising because the configurable surface can be tailored to interact with chiral molecules whose shape confers pharmaceutical effectiveness. Purified molecules may be collected magnetically when a cobalt nanoparticle is designed into the silica core. The composite particles also form colloidal crystals which offer efficient control of light. Reversible helix-coil transitions in the polypeptide shell, as demonstrated above right, may improve the perfection of the colloidal crystals via thermal annealing, even as magnetic inclusions hasten crystal formation.

Langmuir, 20(1), 266 - 269 (2004)



↑ Composite particle expands on heating, shrinks on cooling via inverse helix-coil transition in *m*-cresol.



← Colloidal crystal diffracts light, leading to very pure color separation. Magnetic inclusions and a configurable surface may enable larger, defect-free domains.

Complex Fluids with Extended, Rigid Components

Paul S. Russo, Louisiana State University, DMR-0075810

Education

Ph.D. Degrees & Current Career Choice

Randall Cush (Syngenta, North Carolina)

Garrett Doucet (Amitech, Louisiana)

Postdoctoral Research Associates

Rafael Cueto (remains at LSU)

Grigor Bantchev (remains at LSU)

Rongjuan Cong (consultant, Texas)

Current Graduate Students Supported

Sibel Turksen (Turkey); Erick Soto-Cantu (Mexico); Jian Qiu (China); Jirun Sun (China)

LSU Undergrads & Current Location

Matthew Bergstedt (LSU pre-med), Pavan Bellamkonda (LSU Chem Major), Jonathan Strange (HS Teacher, North Carolina)

Summer Interns & Current Career Path

Bethany Lyles (UC-Berkeley Grad Student)
Thomas Guillot (Emory Ph.D.-MD program)

Outreach & Synergistic Activities

Basic skills training has been integrated into lab/lecture using “live” research projects. In the picture, a graduate student (at back) has taught a Chem 4011 student how to solder copper tubing. She completed a section of the vacuum manifold needed for the small angle X-ray scattering station he is co-building. Three students from Korea and one from Georgia Tech, along with a young Dow scientist on his company-wide rotation, have visited to study or apply optical methods.

